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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/684,346	10/10/2003	Keun Ho Chun	58248-CIP2 (47606)	9221

7590 04/29/2008

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EXAMINER	
SALMON, KATHERINE D	
ART UNIT	PAPER NUMBER
1634	
MAIL DATE	DELIVERY MODE
04/29/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/684,346	CHUN ET AL.	
	Examiner	Art Unit	
	KATHERINE SALMON	1634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 November 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-229* is/are pending in the application.

4a) Of the above claim(s) *See Continuation Sheet* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9,58-61,82-91,106-108,117,131-135 and 157-159* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *4/19/204, 2/17/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continuation of Disposition of Claims: Claims withdrawn from consideration are 10-57,62-81,92-105,109-116,118-130,136-156 and 160-229.

DETAILED ACTION

1. Applicant's election with traverse of Group I Claims 5-9 and 58-61 and linking claims 1-4, 82-91, 106-108, 117, 131-135, and 157-159 in the reply filed on 11/29/2006 is acknowledged. The traversal is on the ground(s) that groups represent different embodiments of a single inventive concept (p. 3 2nd full paragraph). The reply asserts that the pending claims represent an intricate web of knowledge, continuity of effect and consequences of a single invention (p. 3 2nd full paragraph). The reply asserts that a single searchable aspect links all of the claims (p. 3 3rd paragraph). The reply asserts that the examiner must still examine the entire applications on the merits because the search is not serious because all the claims are in the same class (p. 3 last paragraph).

These arguments have been fully reviewed but are not found persuasive. Though the claims are drawn to probes and therefore they share the characteristic of being a probe, each type of probe have different structures and functions. As such the search for one type of probe will not encompass the structural limitations of the other distinct type of probe. The affinity probe is composed of recognition element that is a probe ligand. The cleavage probe is composed of a destabilizing agent and a cleavage site. While the type I coupling probe is composed of coupling element that specifically conjugates a destabilizing to a reaction site. The type II coupling probe is composed of a coupling element that is structurally and functionally different that the type I coupling probe in that it has a reaction inducing agent that specifically converts the reaction site of the conjugation site to the destabilizing agent. The type II(-) coupling probe is composed of a destabiling agent that is conjugated to a different non-conjugable site.

The unimolecular is composed of first object and loop moiety. The bimolecular probe is composed of and object sequence and a complement sequence. The trimolecular probe is composed of third molecule with a second complement sequence. The products of these probe types can be used in materially different processes, for example the affinity probes can be used in hybridization assays, the cleavage probe can be used in a ribozyme assay, the coupling probe can be used in an immunoassay, the coupling probe I can be used to make a nucleic acid array, the coupling probe II can be used to make a protein array, the unimolecular probe can be used in PCR amplification, the bimolecular probe can be used for gene expression, the trimolecular probe can be used in a sandwich hybridization assay. Consequently, the reagents, reaction conditions, and reaction parameters required to make or use each invention are different. Therefore, the inventions of groups of the probes are distinct are patentably distinct from each other. Therefore the search for one type of probe will not provide the limitations for the next type of probe.

Further the separation between the products (probes) and the process of use (assay method) are distinct. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product. See MPEP § 806.05(h). In the instant case the probes of group I-VIII can be used for protein purification, in situ hybridization, encoding proteins which are not required for the methods of group IX-XIV. Furthermore the search for an assay for detection is not coextensive with a search for a

probe. Applicant is pointed to the rejoinder paragraph presented in paragraph 15 of the requirement for restriction.

The requirement is still deemed proper and is therefore made FINAL.

2. Though the groups disclosed in the requirement for restriction mailed out on 6/29/2006 are being maintained there are two inadvertent errors which are being corrected with the group listing set forth below. 1) The requirement for restriction mailed out on 6/29/2006 inadvertently labeled two groups as VIII as such all the groups below have been misnumbered. Set forth below is the corrected numbering of the groups. The requirement for restriction mailed out on 6/29/2006 lists Claims 160-162 as part of the linking group (p. 9 section 11). However, after review of these claims, it is determined that these claims are drawn to trimolecular probes. Based on the group classification presented in the restriction requirement mailed out on 6/29/2006, Claims 160-162 should belong in Group VIII drawn to trimolecular probes. The groupings set forth below correct this error and is the correct group of claims.. It is noted that the election of affinity probe has not been affected by this correction. The corrections of the claims encompassed by the groups have been underlined.

3. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 5-9 and 58-61 drawn to an affinity probe with a probe ligand recognition element, classified in class 536, subclass 23.1.

II. Claims 10-26 and 62-65, drawn to cleavage probe with a destabilizing agent, classified in class 536, subclass 24.5.

III. Claims 27-33 and 66-69, drawn to type I coupling probe, classified in class 536, subclass 23.4.

IV. Claims 34-46 and 70-73, drawn to type II coupling probe, classified in class 424, subclass 178.1.

V. Claims 47-57 and 74-77, drawn to type II(-) coupling probe, classified in class 536, subclass 24.3.

VI. Claims 79-81, 92-93, 110-11, 122-129, 138-142, 153-156, 163-4, drawn to bimolecular probe, classified in class 536, subclass 24.1.

VII. Claims 94-105, 112-116, 143-148, 149-152, 165-166, drawn to unimolecular probe, classified in class 536, subclass 24.2.

VIII. Claims 118-121, 136-137, 160-162 drawn to trimolecular probe, classified in class 536, subclass 24.31.

IX. Claims 167-8, 173, 178-9, 180, 185, 211-212, 217 drawn to assay for detection using an affinity probe, classified in class 435, subclass 6.

X. Claims 169, 174, 178-179, 181, 186, 213, 218, drawn to an assay for detection using a cleavage probe, classified in class 435, subclass 91.3.

XI. Claims 170, 175, 178-179, 182, 185, 214, 219, drawn to an assay for detection using a type I coupling probe, classified in class 435, subclass 91.1.

XII. Claims 172, 177, 178-179, 184, 188, 215-216, 220-221, drawn to assay for detection using type II coupling probe, classified in class 435, subclass 91.2.

XIII. Claims 189-194, 198, drawn to assay for detection using a bimolecular probe, classified in class 435, subclass 6.

XIV. Claims 197, 201-210, drawn to assay for detection using a unimolecular probe, classified in class 435, subclass 69.2.

XV. Claims 199, drawn to assay for detection using a trimolecular probe, classified in class 435, subclass 91.5.

4. Claims 1-4, 82-91, 106-108, 117, 131-135, 157-159 link(s) inventions of group I-VIII The restriction requirement between the linked inventions is subject to the nonallowance of the linking claim(s), claims 1-4, 82-91, 106-108, 117, 131-135, 157-159. Upon the indication of allowability of the linking claim(s), the restriction requirement as to the linked inventions shall be withdrawn and any claim(s) depending from or otherwise requiring all the limitations of the allowable linking claim(s) will be rejoined and fully examined for patentability in accordance with 37 CFR 1.104 Claims that require all the limitations of an allowable linking claim will be entered as a matter of right if the amendment is presented prior to final rejection or allowance, whichever is earlier. Amendments submitted after final rejection are governed by 37 CFR 1.116; amendments submitted after allowance are governed by 37 CFR 1.312. Applicant(s) are advised that if any claim(s) including all the limitations of the allowable linking claim(s) is/are presented in a continuation or divisional application, the claims of

the continuation or divisional application may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application. Where a restriction requirement is withdrawn, the provisions of 35 U.S.C. 121 are no longer applicable. In re Ziegler, 443 F.2d 1211, 1215, 170 USPQ 129, 131-32 (CCPA 1971). See also MPEP § 804.01.

5. An action on the merits for claims 1-9, 58-61, 82-91, 106-108, 117, 131-135, and 157-159 is presented below.

Information Disclosure Statement

6. The applicant has submitted two IDS statements (4/19/2004 and 2/17/2004). These two IDS statements are identical and therefore only one set (4/19/2004) of the art has been considered and the other IDS (2/17/2004) has been marked as a duplicate.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-9, 58-61, 82-91, 106-108, 117, 131-135, 157-159 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1-4, 82-91, 106-108, 117, 131-135, 157-159 are rejected over the phrase "optionally" in part c of claim 1. It is unclear which parts after the term optionally are encompassed. Therefore it is not clear which limitations presented after the term are required limitations of the probe.

Claims 5-9 and 58-61are rejected over the phrase "optionally" in part c of claim 5. It is unclear which parts after the term optionally are encompassed. Therefore it is not clear which limitations presented after the term are required limitations of the probe.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-9, 58-61, 90-91, 106-108, 117, 131-135, 157-159 are rejected under 35 U.S.C. 102(b) as being anticipated by Tyagi et al. (US Patent 5925517 July 20, 1999).

With regard to Claim 1, Tyagi et al. teaches a probe (Figure 1). The instant specification does not explicitly define an object sequence. Therefore the term is broadly interpreted as any sequence. Tyagi et al. teaches that the probe has two arms which are complementary to each other and form a hybridized duplex (Figure 1). One

arm would be considered the first object and the other arm is complementary and would be considered a complement sequence (Figure 1). Tyagi et al. teaches a probe which the length of each arm (3 and 4 of Figure 1) can be 3-25 nucleotides in length (Column 12 lines 50-60).

The instant specification teaches that a recognition element specifically interacts with at least one target agent in the sample to be tested (p. 4 paragraph 21). Therefore the recognition agent is a particular part of the probe that interacts with the target. With regard to Claim 1b, Tyagi et al. teaches a part of the first object sequence and first complement sequence that interacts with a target (2a and 2b Figure 1 and Columns 9 lines 65-67).

With regard to 1c, Tyagi et al. teaches a detectable label (column 10 lines 55-65).

Tyagi et al. teaches that in the presence of a target, the recognition element is altered such that there is a signal (Column 10 lines 5-25).

With regard to Claim 2, Tyagi et al. teaches a probe in which there is a second object and a second complement sequences in the form of a target (Figure 2). Tyagi et al. teaches that a part of the target (considered an object) will bind to the complement region of the probe arm (considered a complement). This region (2b) is not the same region as the first complement (3) (Figure 2, and Figure 1). Tyagi et al. teaches that a part of the target (considered a complement) will bind to the object region of the probe arm (considered an object). This region (2a) is not the same region as the first object (4) (Figures 1 and 2). Tyagi et al. teaches a probe which the length of each arm (3 and 4 of Figure 1) can be 3-25 nucleotides in length (Column 12 lines 50-60). Tyagi et al.

teaches that in the presence of the target there is a decreased amount of the first hybridized duplex and an increase in the second hybridize duple (on and off confirmation) (Figures 1 and 2 and Column 10 lines 5-40).

With regard to Claim 3,Tyagi et al. teaches the recognition element (2 in Figure 1) is conjugated to the first object sequence (figure 1).

With regard to Claim 4, Tyagi et al. teaches the object and the complement are DNA, RNA, or a combination of DNA and RAN (column 8 lines 65-66).

With regard to Claim 5, Tyagi et al. teaches an affinity probe (Figure 1 and Column 10 lines 25-40). Tyagi et al. teaches that the probe has two arm which are complementary to each other and form a hybridized duplex (Figure 1). One arm would be considered the first object and the other arm is complementary and would be considered a complement sequence (Figure 1). Tyagi et al. teaches a probe ligand which interacts with the receptor agent (e.g. the target) (Column 17 lines 65-68 and Column 18 lines 1-25). Tyagi et al. teaches a probe which the length of each arm (3 and 4 of Figure 1) can be 3-25 nucleotides in length (Column 12 lines 50-60). Tyagi et al. teaches a detectable label (column 10 lines 55-65).

With regard to Claim 6, Tyagi et al. teaches the melting temperature of the duplex decreases by at least 10°C when hybridized (column 13 lines 1-9).

With regard to Claims 7 and 8, Tyagi et al. teaches a probe ligand coupled covalently by chemical bonds (Column 17 lines 65-68 and Column 18 lines 1-25).

With regard to Claim 9, Tyagi et al. teaches the use of chemical ligands (Column 17 lines 65-68 and Column 18 lines 1-25).

With regard to Claim 58, Tyagi et al. teaches an affinity probe which the first hybridization duplex is formed in the absence of the receptor agent (e.g. target) (Column 10 lines 5-10).

With regard to Claim 59, Tyagi et al. teaches the melting temperature of the first hybridized duplex is at least 10°C when the target is not present (column 13 lines 1-9).

With regard to Claim 60, Tyagi et al. teaches an affinity probe wherein the second hybridized duplex is preferentially formed in the presence of a target (e.g. and excess) (column 10 lines 1-24).

With regard to Claim 61, Tyagi et al. teaches the melting temperature of the duplex decreases by at least 10°C when hybridized (e.g. when in presence of an excess of target) (column 13 lines 1-9).

With regard to Claims 90 and 91, Tyagi et al. teaches FRET (quencher and fluorescer) attached to the probe) to detect change in fluorescence (Column 5 lines 65-66 and Column 6 lines 1-6).

It is noted that Claims 106 and 107 are identical in limitations except the arm sequence in 106 is liked to the 5' terminus of the first object whereas the arm sequence in 107 is linked to the first complement sequence. The terms "first object sequence" and "first complement sequence" have not been fully defined as such they encompass any nucleic acid strands which are complementary. With regard to Claims 106 and 107, Takagi et al teaches arm sequences which are covalently liked to the first object sequence or the complement sequence at the 5' or 3' end (Figure 3, 34 and 35). It is

noted that this is the same structure which is described as the arm sequence of the instant specifications Figure 20 wherein in Figure 20 8a and 8b are the arm sequences. With regard to Claim 108, the claim is drawn to the limitations of Claims 106 and 107 wherein two of these structures are hybridized together. Takagi et al. teaches a probe that is bimolecular, wherein each molecule has the structure and are hybridizable together in a closed confirmation state (column 5 lines 9-20). Takagi et al discloses the arms are between about 3 and about 35 (Figure 3). Therefore, Takagi et al. teaches the limitations of the probe as claimed by Claim 108.

With regard to Claim 117, Tyagi et al. teaches a detectable label such as a fluorescer (Column 5 lines 65-66 and Column 6 lines 1-6).

With regard to Claims 131, Tyagi et al. teaches FRET (quencher and fluorescer) attached to the probe) to detect change in fluorescence (Column 5 lines 65-66 and Column 6 lines 1-6). Tyagi et al. teaches that the first moiety (quencher) is located on the first object sequence and the second moiety (fluorescer) is located on the complement sequence which interacts when the hybridized duplex is formed (figure 1 6, 7 and Column 10 lines 66-67 and Column 11 lines 1-20).

With regard to Claim 132, Takagi et al. teaches a probe that is bimolecular, wherein each molecule has the structure and are hybridizable together in a closed confirmation state (column 5 lines 9-20). Therefore there will be two molecules hybridized that are identical. Therefore Tyagi et al. teaches FRET (quencher and fluorescer) attached to the probe) to detect change in fluorescence (Column 5 lines 65-66 and Column 6 lines 1-6). Tyagi et al. teaches that the first moiety (quencher) is

located on the first object sequence and the second moiety (fluorescer) is located on the complement sequence which interacts when the hybridized duplex is formed (figure 1 6, 7 and Column 10 lines 66-67 and Column 11 lines 1-20). On the second molecule will be a third moiety (quencher) is located on the second object sequence and the fourth moiety (fluorescer) is located on the second complement sequence which interacts when the hybridized duplex is formed (figure 1 6, 7 and Column 10 lines 66-67 and Column 11 lines 1-20).

With regard to Claims 134, Tayagi et al. teaches that the first and third label are the same (quenchers).

With regard to Claim 135, Tyagi et al. teaches FRET (quencher and fluorescer) attached to the probe) to detect change in fluorescence (Column 5 lines 65-66 and Column 6 lines 1-6).

It is noted that Claims 157 and 158 are identical in limitations except the arm sequence in 106 is liked to the 5' terminus of the first object whereas the arm sequence in 107 is linked to the first complement sequence. The terms "first object sequence" and "first complement sequence" have not been fully defined as such they encompass any nucleic acid strands which are complementary. With regard to Claims 157 and 158, Takagi et al teaches arm sequences which are covalently liked to the first object sequence or the complement sequence at the 5' or 3' end (Figure 3, 34 and 35). It is noted that this is the same structure which is described as the arm sequence of the instant specifications Figure 20 wherein in Figure 20 8a and 8b are the arm sequences. Tyagi et al. teaches FRET (quencher and fluorescer) attached to the probe) to detect

change in fluorescence (Column 5 lines 65-66 and Column 6 lines 1-6). Tyagi et al. teaches that the first moiety (quencher) is located on the first object sequence and the second moiety (fluorescer) is located on the complement sequence which interacts when the hybridized duplex is formed (figure 1 6, 7 and Column 10 lines 66-67 and Column 11 lines 1-20).

With regard to Claim 159, the claim is drawn to the limitations of Claims 106 and 107 wherein two of these structures are hybridized together. Takagi et al. teaches a probe that is bimolecular, wherein each molecule has the structure and are hybridizable together in a closed confirmation state (column 5 lines 9-20). Takagi et al discloses the arms are between about 3 and about 35 (Figure 3). Therefore, Takagi et al. teaches the limitations of the probe as claimed by Claim 159. Takagi et al. teaches a probe that is bimolecular, wherein each molecule has the structure and are hybridizable together in a closed confirmation state (column 5 lines 9-20). Therefore there will be two molecules hybridized that are identical. Therefore Tyagi et al. teaches FRET (quencher and fluorescer) attached to the probe) to detect change in fluorescence (Column 5 lines 65-66 and Column 6 lines 1-6). Tyagi et al. teaches that the first moiety (quencher) is located on the first object sequence and the second moiety (fluorescer) is located on the complement sequence which interacts when the hybridized duplex is formed (figure 1 6, 7 and Column 10 lines 66-67 and Column 11 lines 1-20). On the second molecule will be a third moiety (quencher) is located on the second object sequence and the fourth moiety (fluorescer) is located on the second complement sequence which interacts

when the hybridized duplex is formed (figure 1 6, 7 and Column 10 lines 66-67 and Column 11 lines 1-20).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 82-89 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tyagi et al. (US Patent 5925517 July 20, 1999) in view of Kolesar et al. (US Patent 6261781 July 17, 2001).

Tyagi et al. teaches a probe (Figure 1). The instant specification does not

explicitly define an object sequence. Therefore the term is broadly interpreted as any sequence. Tyagi et al. teaches that the probe has two arm which are complementary to each other and form a hybridized duplex (Figure 1). One arm would be considered the first object and the other arm is complementary and would be considered a complement sequence (Figure 1). Tyagi et al. teaches a probe which the length of each arm (3 and 4 of Figure 1) can be 3-25 nucleotides in length (Column 12 lines 50-60).

The instant specification teaches that a recognition element specifically interacts with at least one target agent in the sample to be tested (p. 4 paragraph 21). Therefore the recognition agent is a particular part of the probe that interacts with the target. Tyagi et al. teaches a part of the first object sequence and first complement sequence that interacts with a target (2a and 2b Figure 1 and Columns 9 lines 65-67).

Tyagi et al. teaches a detectable label (column 10 lines 55-65).

Tyagi et al. teaches that in the presence of a target, the recognition element is altered such that there is a signal (Column 10 lines 5-25).

With regard to Claim 83, Tyagi et al. teaches a probe that is bimolecular, wherein each molecule has the structure and are hybridizable together in a closed confirmation state (column 5 lines 9-20), therefore the probes a first molecule and a second molecule.

With regard to Claim 84, Tyagi et al. teaches a probe wherein it is immobilized to a support (Figure 10).

With regard to Claims 85 and 89, Tyagi et al. teaches the first object and first complement are covalently linked by a loop (Figure 3).

With regard to Claims 86 and 88, Tyagi et al teaches that the loop connects the 3' of the object to the 5' of the complement and therefore the first object, the loop, and the first complement are covalently liked in a 5' to 3' direction (Figure 3). With regard to

Claim 87, Tyagi et al. teaches a probe wherein the loop has 37 nucleotides (between 4 and 100 nucleotides) (Figure 3).

With Tyagi et al. however, does not teaches the detectable label is a intercalating dye that can preferentially bind to double-stranded nucleic acids.

With regard to Claim 82, Kolesar et al. teaches probes with a detectable label such as an intercalating dye (Column 7, lines 35-50).

Therefore it would be prima facie obvious to one of ordinary skill in the art at the time the invention was made to modify the probe of Tyagi et al. to have an intercalator detectable label as taught by Kolesar et al. with a reasonable expectation of success. The ordinary artisan would be motivated to modify the probe of Tyagi et al. to have an intercalator detectable label as taught by Kolesar et al. because Kolesar et al. teaches that using an intercalating dye in a duplex hybrid dramatically increases the stability of the hybrid especially for RNA-DNA hybrids (Column 7, lines 35-50). Therefore the ordinary artisan would be motivated to label with intercalating dye to increase stability.

Conclusion

12. No Claims are allowed.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KATHERINE SALMON whose telephone number is (571)272-3316. The examiner can normally be reached on Monday-Friday 8AM-430PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ram Shukla can be reached on (571) 272-0735. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Katherine Salmon/
Examiner, Art Unit 1634

/Ram R. Shukla/

Supervisory Patent Examiner, Art Unit 1634